

**NAVSTAX**

**KINGNAV**

**RADIO NAVIGATION STACK**

**USER MANUAL**

# Table Of Contents

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Introduction	1-1
Installation	2-1
2D Panel Configuration	3-1
3D (Virtual Cockpit) Use	4-1
KMA 30 Audio Panel	5-1
KX 165A Navigation/Communication Radio	6-1
KX 165 Navigation/Communication Radio	7-1
KN 62A Distance Measuring Equipment	8-1
KR 87 Automatic Direction Finder	9-1
KT 74 Transponder	10-1

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# Introduction

Welcome to the most advanced replacement avionics available for Microsoft Flight Simulator X and Lockheed Martin's Prepar3D. We've combined advanced programming and top-of-the-line graphical fidelity to closely emulate some of the most popular radio communication units available on the market today.

Where possible, within the limitations posed by the simulation platforms themselves, we've tried to reach complete functionality. This means that these units will adhere to the behaviour of the real world equipment they are based upon, creating a more realistic and immersive environment for flight simulation.

Our design goal has been focused on flexibility: The gauges are available to be used in the 3D virtual cockpit (requires integration by the developer) as well being ready to use as 2D popup panels (easily integrated by the user). To top it off, we're also making a development kit freely available to all aircraft developers that consists of all the components they need to successfully integrate these gauges in their aircraft.

The **KINGNAV** radio stack included in this release contains 6 individual components that should be familiar to nearly every pilot: The **KMA 30 Audio Panel**, the **KX 165A Navigation/Communication Radio**, the older **KX 165 Navigation/Communication Radio**, the **KR 87 Automatic Direction Finder**, the **KN 62A DME**, and finally, the feature rich **KT 74 Transponder**.

These components may be used individually or in any combination desired in order to outfit a specific aircraft or fill a specific role.

Although these items of equipment feature differing levels of complexity, this does mirror the real world. The simplicity of the KN 62A DME is evident by the lack of controls and labels present, for example, but the amount of functionality packed into the KX 165A Nav/Comm Radio more than makes up for it by includ-



ing not only a 32 channel memory for the communication radio, but also multiple modes for the navigation radio including a CDI mode, a Bearing mode, a Radial mode, as well as a timer.

When combined together, it makes for an impressive array of equipment. Regardless of your goals in flight simulation, whether it be casual entertainment or more in-depth familiarization, we've aimed to set a high standard that has something to offer everyone.

## Thanks for choosing NavStax!

# Installation

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## Platform Compatibility

The NavStax KINGNAV avionics suite is comprised of a collection of compiled gauge files which are installed to the simulator file structure. Hence, the compatibility of these gauges is limited to these supported simulator platforms:

### Flight Simulator X (CD or Steam versions)

#### Prepar3D Version 3 (32 bit)

#### Prepar3D Version 4 (64 bit)

One of the above simulators must be installed and usable for the NavStax KINGNAV gauges to function as intended.

The NavStax KINGNAV gauges are not designed to function separately from the simulator, nor will they function on a separate computer.

## Aircraft Compatibility

The individual components of the NavStax KINGNAV suite are compatible with all default aircraft and most 3rd party aircraft add-ons when used as **2D popup panels**.

**Compatibility for the 3D components of the NavStax KINGNAV suite is dependent on integration, via the freely available SDK, into the aircraft by the aircraft developer.**

If the NavStax gauges have not been integrated into the aircraft by the aircraft developer, they will **NOT** be available in 3D!!

The only partial work-around to this is when the design of the aircraft's virtual cockpit allows for user replacement of the gauges in the avionics section of the panel **AND** the original gauges are flat / 2D in nature. This typically only applies to older add-on aircraft (which in turn aren't generally compatible with the latest version of Prepar3D).

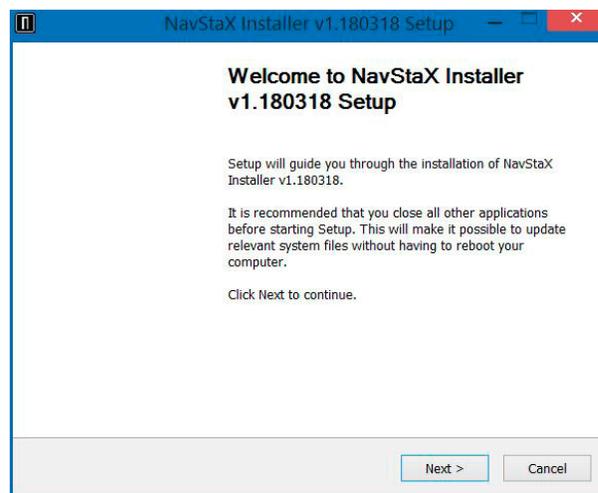
## Product Installation

Before starting, it is recommended to close any open applications, as well as temporarily disable any active antivirus software.

To begin installation of the KINGNAV suite, launch the installer you have been provided with at purchase.

After purchase, you will have been given a link or an option to download a compressed (.zip) file. This compressed file contains an executable (.exe) file which is the installer for the KINGNAV suite.

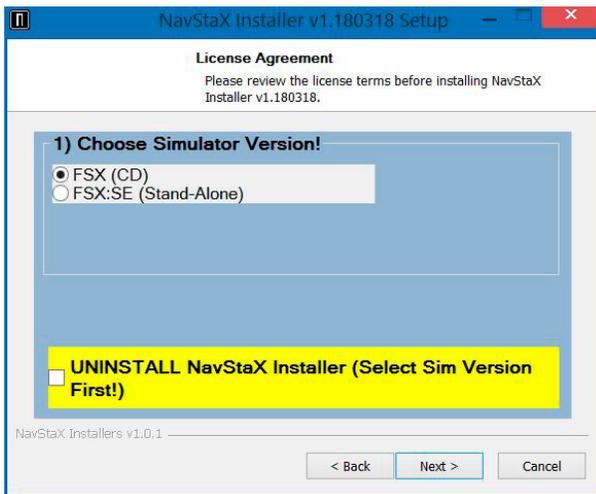
Using Windows File Explorer or the file compression utility of your choice, unzip this file to a location of your choice. Once unzipped, you may begin installation by right clicking on the executable (.exe) file, then selecting "Run as administrator".



The installer will run, showing an initial welcome screen. Left click on the 'Next' button to continue.

The next screen will display a license agreement. You must accept this agreement to install the NavStax KINGNAV avionics suite. To accept and continue, left click the 'I Agree' button.

## Choosing a Simulator

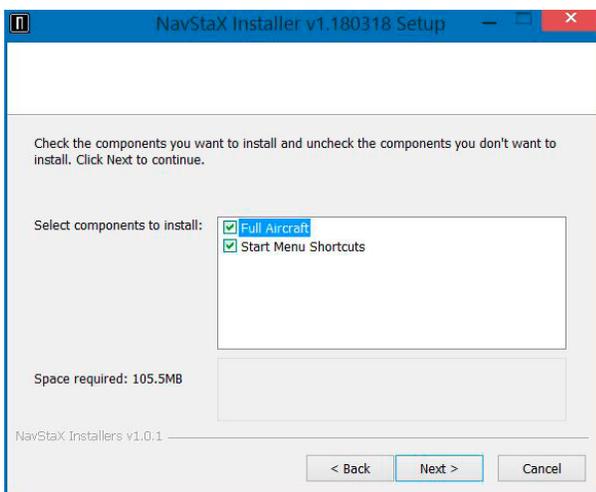


The next screen allows you to choose a flight simulator platform to install to. Only platforms which are detected as being installed are shown.

Only one platform at a time may be selected from this screen. To install to multiple platforms on the same computer, please re-run the installer.

When ready, left click the 'Next' button.

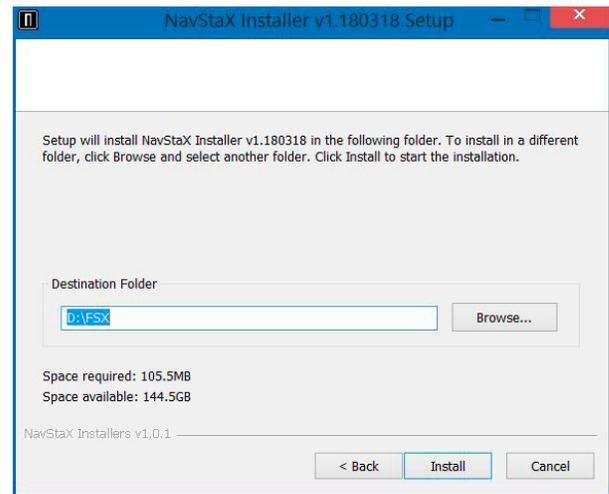
## Component Selection



Although you are able to select which items you would like installed from this screen, for ease of use we do not recommend deselecting any items.

Left click the 'Next' button to continue.

## Confirm Install Location



The final screen that appears before the installation starts allows you to verify and/or change the directory that the gauges will be installed in. So long as the directory shown has been detected properly, we do not recommend choosing an alternate location for installation.

When ready to install, left click the 'Install' button. Installation of the required files will then proceed.

## File Locations

The NavStax KINGNAV avionics suite installs files in a few different locations.

It installs the gauges themselves in the Gauges subfolder of your simulators root folder. The product manual and a copy of the gauge textures are installed to a new subfolder titled 'Navstax' in your simulator's root folder.

Finally, a folder is created in %localappdata% titled 'Navstax'. This folder holds the 2D panel configuration utility and its supporting files. A shortcut will be placed on your desktop to this utility.

**Important:** Installation of the NavStax KINGNAV avionics suite alone **does not** automatically configure any aircraft to use the avionics! This may be done using the configuration utility, or by hand!

# 2D Panel Configuration

Initially, there won't be any aircraft in your simulator configured to use the NavStax KINGNAV avionics suite of gauges. They require further installation into an aircraft in order to be used, by modifying the **panel.cfg** file used by that aircraft.

Although this file may be edited manually, we have included an application that is capable of doing the heavy lifting for you.



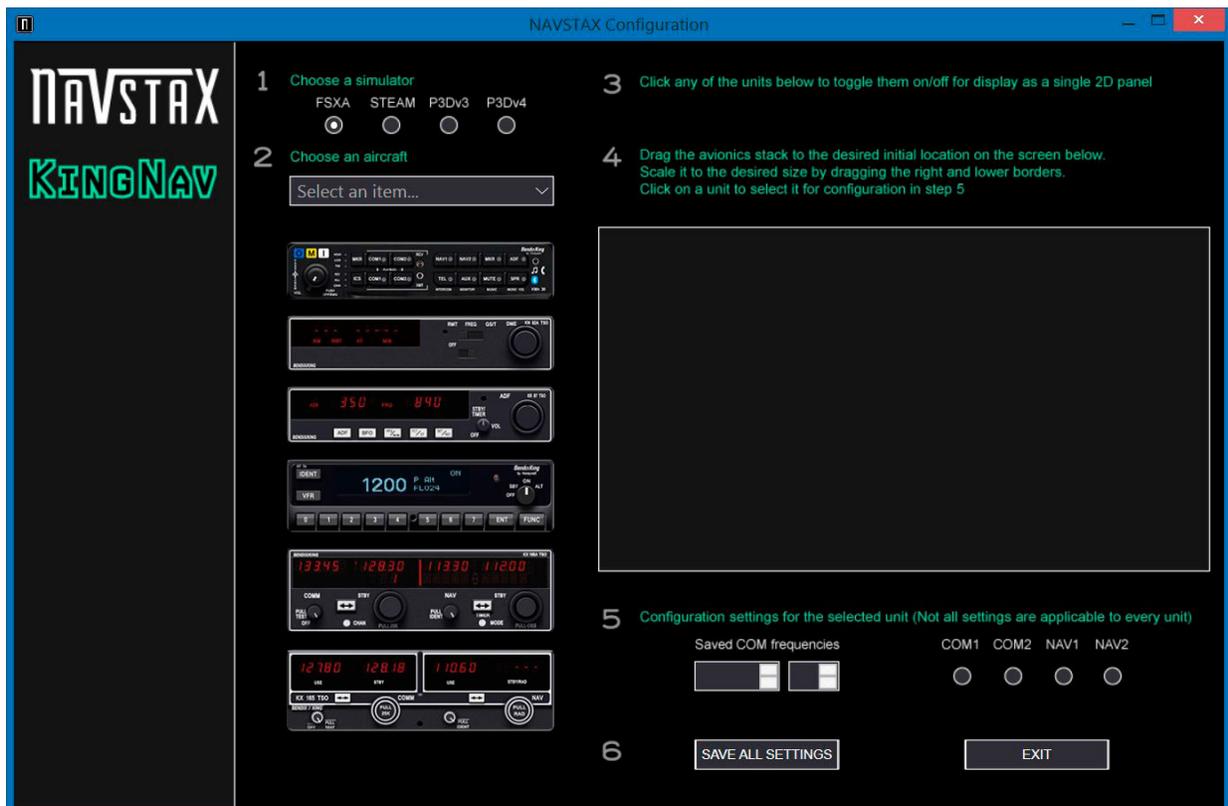
Located on your desktop after installation is a shortcut which allows you to launch the NavStax Configuration utility (pictured below). This handy application lets

you easily configure a user-definable collection of 2D popup gauges into the aircraft of your choice.

Using the configuration utility is very easy. Simply select your proper simulator, then select the aircraft you wish to install the 2D panel into. Next, click on any of the avionics units from the right in order to see them displayed on the box to the left. Note that this box is a representation of your screen; you can change where the gauges will open by dragging the stack of selected gauges with your mouse.

Clicking a single gauge that appears on the stack will also allow to you edit any additional details for the unit in regards to channel memory and COM/NAV identification.

Once the panel is configured to your liking, simply click the 'Save All Settings' button at the lower left.



# 3D (Virtual Cockpit) Use

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Integration of the NavStax KINGNAV avionics suite into the 3D virtual cockpit, complete with the gauges richly rendered as 3D models, can ONLY be done by the developer of the aircraft. It is up to the developer to include support for these gauges by utilizing our freely available development kit, which contains all files they might need to do so, such as the 3D mesh, textures, and configuration files.

However, even if an aircraft developer has integrated support for our avionics suite into their product, it is still required that a properly licensed installation of

the NavStax KINGNAV avionics suite be present on the computer being used.

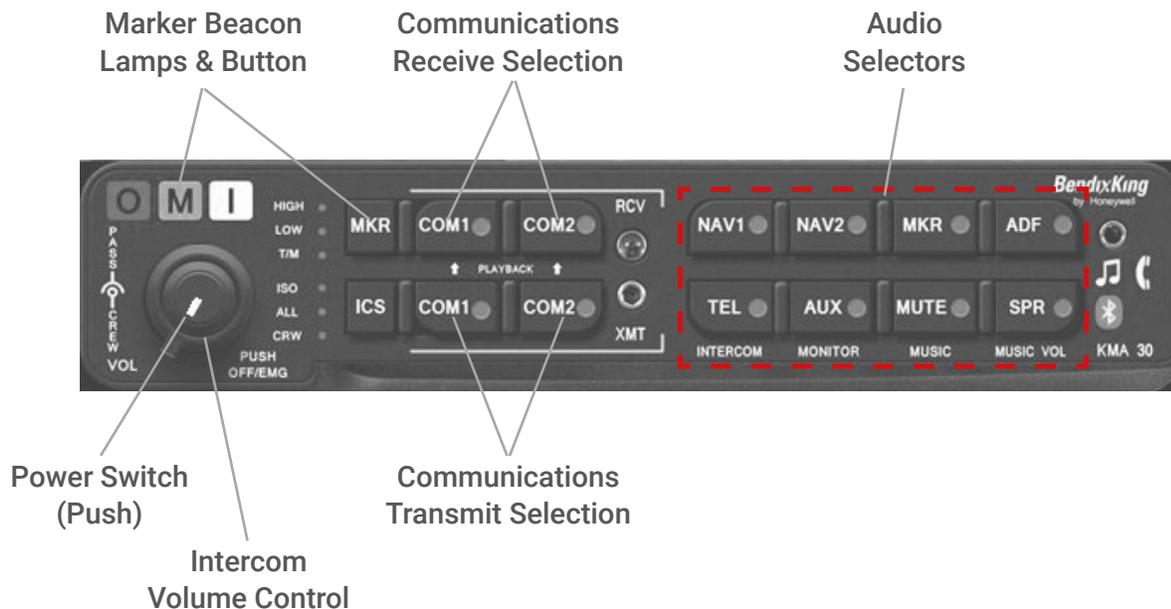
For any developer interested in receiving a copy of our development kit, please email us: [info@navstax.com](mailto:info@navstax.com).

Although it will be up to the developer to correctly identify the gauges as COMM 1/2 or NAV 1/2, the NavStax configuration utility may still be used for setting up the channel memory banks of the KX 165A Nav/Comm radio.



Above: The NavStax KINGNAV Avionics Suite integrated into the MilViz 310R Redux

# KMA 30 Audio Panel



(Note: Due to simulator platform limitations regarding how audio within the simulator is handled, there are certain features of the KMA 30 that aren't possible to replicate. This includes the power fail safe audio system, the intercom system, the internal recorder system, the split mode feature, and all telephone and music playback functions. Due to these limitations, the smart function keys on the lower audio selector buttons are not implemented nor described here.)

## Power Switch

The power switch controls all audio selector panel functions, intercom and marker beacon receiver. Pushing the button turns the power on or off.

## Communications Transmit (XMT) Selection

To select COM 1 or COM 2 for transmit, press the button on the bottom row, next to the XMT legend. The bottom and top button indicators light, showing that

you will transmit and receive on the selected radio. The audio on the radio selected for transmit cannot be deselected.

## Communications Receive (RCV) Selection

To listen to the other radio, press the upper button, in the RCV (receive) section. When a com is selected for receive, it will stay selected until manually deselected, even if you select, and then deselect its transmitter.

## Audio Selectors

These buttons select the switched navigation receivers. The DME input (if present) is also shared with AUX. (Note: The primary functions on the lower row of the audio selector buttons are not implemented due to simulator limitations.)

## **Marker Beacon Operation**

The Marker Beacon Receiver uses visual and audio indicators to alert you when the aircraft passes over a Beacon transmitter. The Blue, Outer Marker lamp has an associated 400-Hertz 'dash' tone. The lamp and tone will be keyed at a rate of two tones/ashes per second when the aircraft is in the range of the Outer Marker.

The Amber, Middle Marker lamp is coupled with a 1300 Hertz tone, keyed alternately with short 'dot' and long 'dash' bursts at 95 combinations per minute.

The White, Inner marker lamp has a 3000 Hertz 'dot' tone, and will be keyed at a rate of six times per second.

Marker Beacon Receiver audio can be heard by selecting the "MKR" pushbutton switch.

The MKR button located next to the indicator lights is used to set the receiver sensitivity, to test the indicator lamps, and mute the marker audio. Pressing the MKR button for one second will cause the marker audio to mute. The next beacon received will re-activate the audio. Holding the MKR button for one second also activates marker test, labelled "T/M" and illuminates all three lights simultaneously to confirm the lights (internal and external) are working. Releasing the button returns to the last sensitivity.

# KX 165A Nav/Comm Radio



## COMM Transceiver

(Note: Only the 25 kHz version of the KX 165A is represented in this avionics package.)

To turn on, rotate the VOL knob clockwise from the OFF position. The left portion of the digital display readout is allocated for COMM ACTIVE and COMM STANDBY frequencies with a "T" between them to indicate TRANSMIT and an "R" to indicate RECEIVE modes of operation.

(Note: Because there is no possibility of determining transmitting or receiving within the simulator environment, the display of the KX 165A will always read 'R'.)

Select the desired operating frequency in the standby display by rotating the Frequency Select Knobs either clockwise or counterclockwise. A clockwise rotation

will increment the previous frequency while a counterclockwise rotation will decrement the previous frequency.

The outer knob will change the MHz portion of the standby display. At one band-edge (118 or 136 MHz) the following 1 MHz change will wrap around to the other band-edge.

The inner knob will change the kHz portion of the standby display. It will change in increments of 50 kHz when the knob is pushed in and 25 kHz when the knob is pulled out. The frequency wrap around at the edge of the band is also utilized when incrementing or decrementing the kHz portion of the standby display.

To tune the radio to the desired operating frequency, the desired frequency must be entered into the standby display and then the transfer button must be pushed.

This will trade the contents of the active and standby displays.

The operating frequency can also be entered by accessing the ACTIVE ENTRY (direct tune) mode which is done by pushing and holding the COMM TRANSFER button for 2 or more seconds. In the direct tune mode, only the active part of the display is visible. The desired frequency can be directly entered into the display. Push the COMM TRANSFER button again to return to the active/standby display.

The transceiver is always tuned to the frequency appearing in the ACTIVE display. It is therefore possible to have two different frequencies stored in the ACTIVE and STANDBY displays and to change back and forth between them at the simple push of the transfer button.

The KX 155A and KX 165A also have provisions to program 32 channels. Pressing the CHAN button for 2 or more seconds will cause the unit to enter the channel program mode. Upon entering the channel program mode, "PG" is displayed next to the channel number and the channel number will flash indicating that it can be programmed.

The desired channel can be selected by turning the comm kHz knob. The channel frequency can be entered by pushing the COMM TRANSFER button which will cause the standby frequency to flash. The comm frequency knobs are then used to enter the desired frequency.

Additional channels may be programmed by pressing the COMM TRANSFER button and using the same procedure. To exit the program mode and save the channel information, momentarily push the CHAN button. This will cause the unit to return to the previous frequency entry mode. The unit will also exit the channel program mode if there is no button or knob activity for 20 seconds. The channel selection mode can then be entered by momentarily pushing the CHAN button. The comm frequency knobs can be used to select the desired channel.

The unit will automatically exit the channel mode, with the channel frequency remaining in the STANDBY window, if no channel is selected within 5 seconds after entering the channel selection mode. The channel frequency is then made the ACTIVE frequency in the normal manner by pressing the COMM TRANSFER button.

### **NAV Receiver**

The right portion of the display is allocated to NAV receiver information. The frequency channeling is similar to the COMM when operating in the frequency mode. The NAV increment/decrement knobs are located on the right hand side of the front panel.

The outer knob operates in 1 MHz steps and increments/decrements the STANDBY frequency display. The inner knob operates in 50 kHz steps. The NAV receiver's lower and upper frequency limits are 108.00 MHz and 117.95 MHz. Exceeding the upper limit of frequency band will automatically return to the lower limit and vice versa.

Depressing the NAV frequency transfer button for 2 seconds or more will cause the display to go in to the ACTIVE ENTRY mode. Only the ACTIVE frequency will be displayed and it can be directly changed by using the NAV inc/dec knobs. The display will return to the ACTIVE/STANDBY mode when the NAV frequency transfer button is pushed.

### **CDI Mode**

Depressing the mode button will cause the NAV display to go from the ACTIVE/STANDBY format to the ACTIVE/CDI (Course Deviation Indicator) format.

The vertical "needle" moves side to side similar to a mechanical CDI. When the needle is centered, the aircraft is on the selected OBS course. When the active frequency is tuned to a VOR frequency, the center of the CDI scale displays the "TO" or "FROM" indicator.

In the CDI mode, the increment/decrement knob (pushed in) channels the ACTIVE frequency window and depressing the frequency transfer button will cause the ACTIVE frequency to be placed in blind stor-

age and the STANDBY frequency (in blind storage) to be displayed in the ACTIVE window display.

When the ACTIVE window is tuned to a VOR frequency, the standby frequency area is replaced by a three digit OBS (Omni Bearing Selector) display. The desired OBS course can be selected by pulling out the inner NAV frequency knob and turning it. The CDI needle may be automatically centered with a "TO" indication by depressing the mode button for 2 seconds. This OBS display is independent of any OBS course selected on an external CDI or HSI. An "OBS" in the middle of the NAV display will flash while the inner NAV frequency knob is pulled out. The CDI is displayed on the line below the frequency/OBS.

When the ACTIVE window is tuned to a localizer frequency, the standby frequency area is replaced by "LOC". When the received signal is too weak to ensure accuracy the display below the tuned NAV frequency will display "FLAG".

### **Bearing Mode**

Depressing the mode button will cause the NAV display to go from the ACTIVE/CDI format to the ACTIVE/BEARING format. In the BEARING mode, the increment/decrement knob channels the ACTIVE frequency window and depressing the frequency transfer button will cause the ACTIVE frequency to be placed in blind storage and the STANDBY frequency (in blind storage) to be displayed in the ACTIVE window display. In bearing mode of operation, the right hand window of NAV display shows the bearing TO the station.

### **Radial Mode**

Another push of the mode button will cause the NAV display to go from the ACTIVE/BEARING format to the ACTIVE/RADIAL format. In the RADIAL mode, the increment/ decrement knob channels the ACTIVE frequency window and depressing the frequency transfer button will cause the ACTIVE frequency to be placed in blind storage and the STANDBY frequency (in blind storage) to be displayed in the ACTIVE window display. In radial mode of operation, the right hand window of NAV display shows the radial FROM the station.

### **Timer Mode**

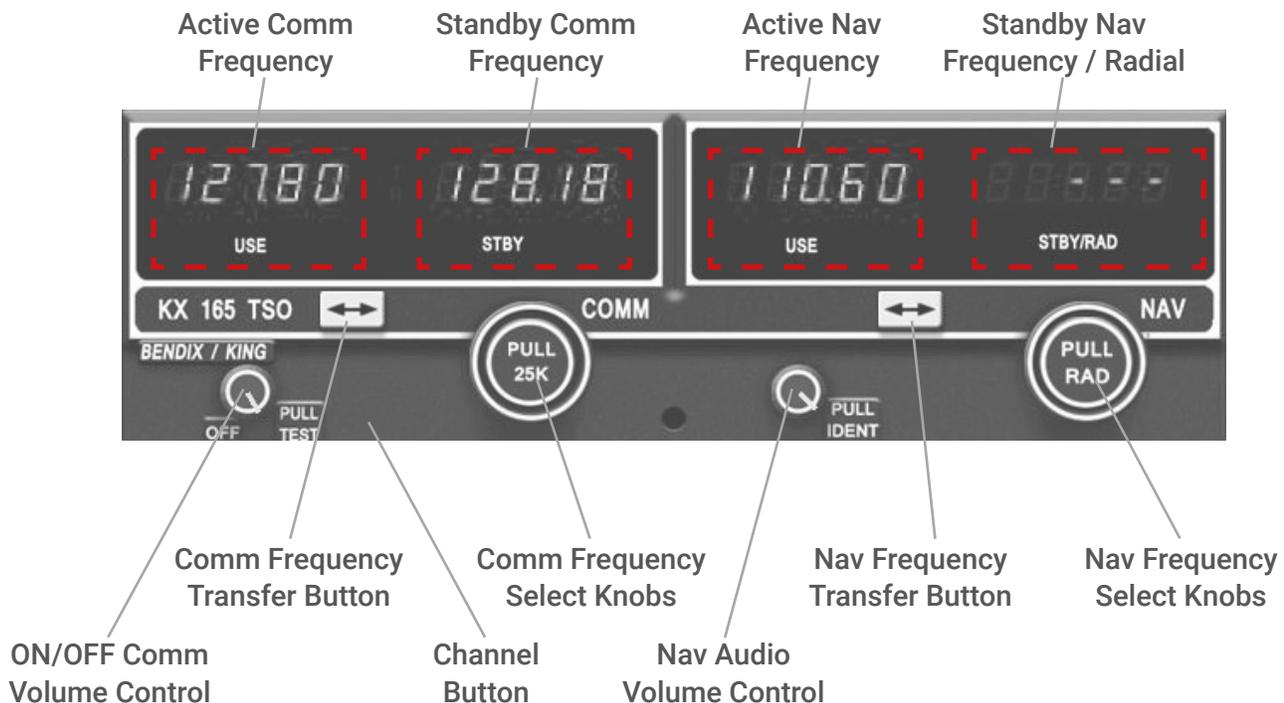
Another push of the mode button will cause the unit to go into the TIMER mode.

When the unit is turned on the elapsed timer begins counting upwards from zero. The timer can be stopped and reset to zero by pushing the NAV frequency transfer button for 2 seconds or more causing the ET on the display to flash. In this state the timer can be set as a countdown timer or the elapsed timer can be restarted.

The countdown timer is set by using the NAV inc/dec knobs to set the desired time and then pushing the NAV frequency transfer button to start the timer. The outer knob selects minutes, the inner knob in the "in" position selects ten second intervals, and the inner knob in the "out" position selects individual seconds. After the countdown timer reaches zero, the counter will begin to count upwards indefinitely while flashing for the first 15 seconds.

Or the elapsed timer can also be reset to zero and started again after it has been stopped and reset to zero by pushing the NAV frequency transfer button.

# KX 165 Nav/Comm Radio



## COMM Transceiver

To turn on, rotate the VOL knob clockwise from the OFF position. The left display is allocated for COMM ACTIVE and COMM STANDBY frequencies with a “T” between them to indicate that the mic is keyed.

(Note: Because there is no possibility of determining transmitting or receiving within the simulator environment, the display of the KX 165 will always read ‘T’.)

Select the desired operating frequency in the standby display by rotating the Frequency Select Knobs either clockwise or counterclockwise. A clockwise rotation will increment the previous frequency while a counterclockwise rotation will decrement the previous frequency.

The outer knob will change the MHz portion of the standby display. At one band-edge (118 or 136 MHz) the following 1 MHz change will wrap around to the other band-edge.

The inner knob will change the kHz portion of the standby display. It will change in increments of 50 kHz when the knob is pushed in and 25 kHz when the knob is pulled out. The frequency wrap around at the edge of the band is also utilized when incrementing or decrementing the kHz portion of the standby display.

The transceiver is always tuned to the frequency appearing in the ACTIVE display. It is therefore possible to have two different frequencies stored in the ACTIVE and STANDBY displays and to change back and forth between them at the simple push of the transfer button.

## **NAV Receiver**

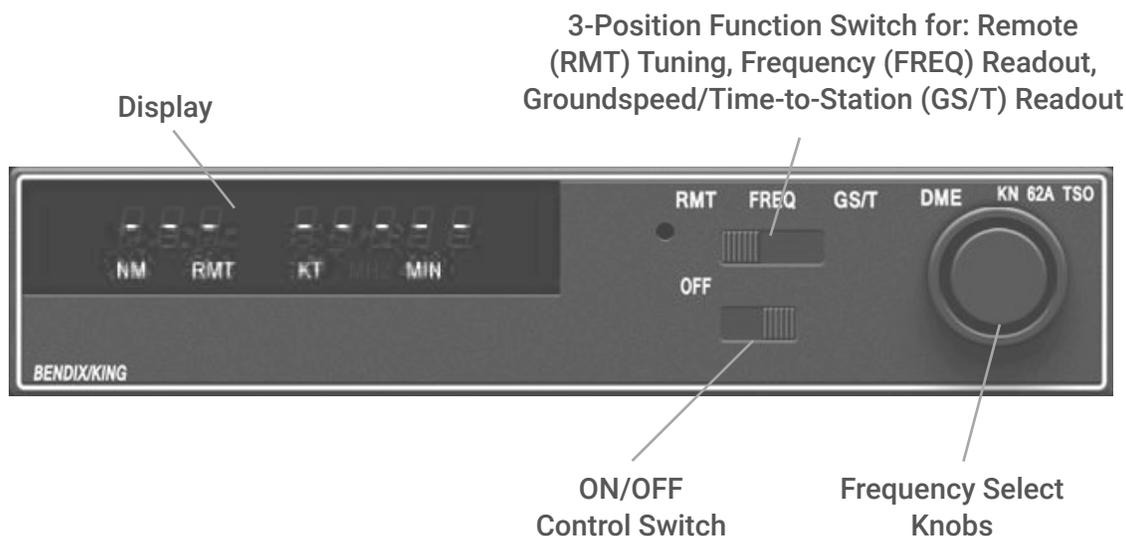
The right display is allocated to NAV receiver information. The frequency channeling is similar to the COMM when operating in the frequency mode. The NAV increment/decrement knobs are located on the right hand side of the front panel.

The outer knob operates in 1 MHz steps and increments/decrements the STANDBY frequency display. The inner knob operates in 50 kHz steps. The NAV receiver's lower and upper frequency limits are 108.00 MHz and 117.95 MHz. Exceeding the upper limit of frequency band will automatically return to the lower limit and vice versa.

## **VOR Radial Mode**

When the smaller NAV kHz frequency selector knob is pulled out, the VOR Radial FROM the station in "USE" is digitally displayed in the "STBY/RAD" window. The STANDBY frequency will go into non-displayed storage from which it can be "flip-flopped" into "USE" at a press of the transfer button. While in the "RADIAL" mode, rotation of the frequency selector knobs will channel the active frequency directly in the "USE" window display. If the VOR signal is too weak to provide a Radial readout, a "warning flag" is activated consisting of three dashes "- - -" displayed in the "STBY/RAD" window. Also, when an ILS frequency has been selected, the digital flag "- - -" will appear in the "STBY/RAD" window.

# KN 62A Distance Measuring Equipment



## Operation

Turn on the unit only after engine start-up. Also, turn avionics off prior to engine shut-down. These simple precautions should be practiced with all avionics.

The 3-position function switch determines both the information displayed and the channeling source.

Place the function switch on Frequency (FREQ). The unit is channeled internally\* with its own two concentric frequency selection knobs. The smaller of the two knobs has an "in" and an "out" position. When in the "in" position, this smaller knob changes the 0.1 MHz digit (0.0, 0.1, 0.2, etc.). When pulled "out", it adds 0.05 MHz to the frequency and tunes in 0.1 MHz steps (0.05, 0.15, 0.25, etc.). Pushing the smaller knob "in" subtracts 0.05 MHz from the displayed frequency. The outer, larger knob changes the larger digits (1 MHz, 10 MHz). In FREQ mode, the unit will display distance and the selected frequency.

Now move the function switch to the Groundspeed/Time-to-Station (GS/T) position. The unit will hold the

internally selected frequency and will display distance, groundspeed and time-to-station.

Rotating the frequency selector at this time will have no effect on the display, because the DME is in "Frequency Hold". This frequency hold feature in the GS/T mode prevents accidental rechanneling of the DME when the frequency is not displayed.

Place the function switch in the Remote\* (RMT) position, and your DME will be channeled when you select your NAV frequency on the NAV receiver. When the unit locks on a ground station, it will display distance, groundspeed and time-to-station.

\* Note: Due to limitations present within the simulator, this unit does NOT operate with a separate internal frequency. Instead, it uses the NAV 2 frequency for both FREQ and RMT modes.

## Operational Notes

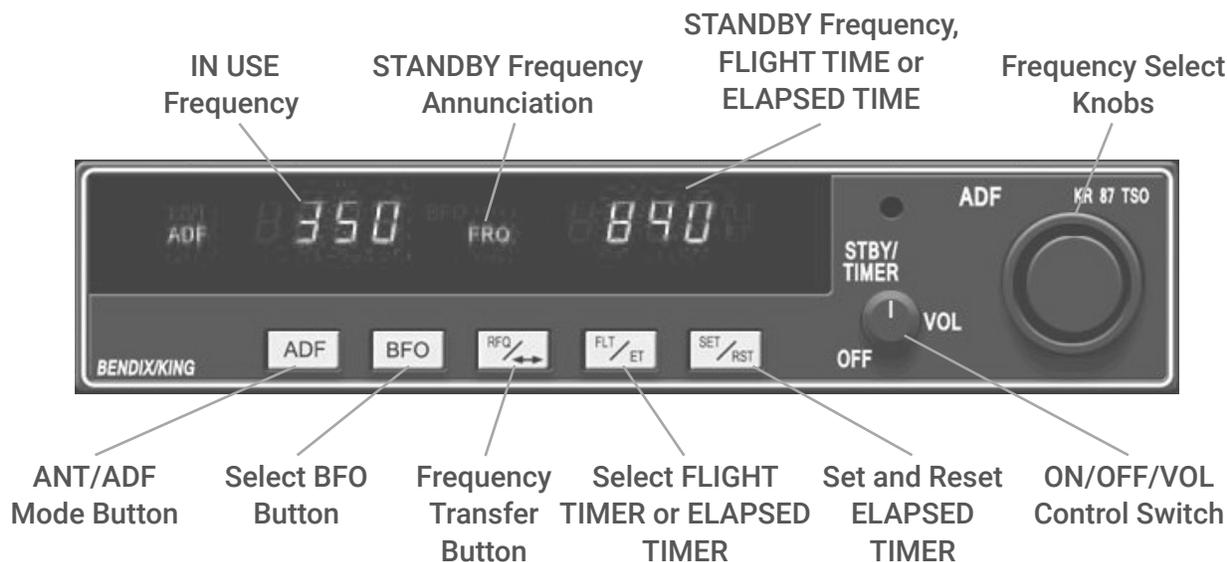
The unit electronically converts to distance the elapsed time required for signals to travel to and from

the ground station. This distance is then indicated in nautical miles on the Distance/ Speed/Time-to-Station display. This distance, commonly referred to as slant range distance, should not be confused with actual along-the-ground distance. The difference between actual ground distance and slant range is least at low altitude and/or long range. If the range is three times the altitude or greater, error is negligible.

The effective range of DME depends on many factors, most important being the altitude of the aircraft. Other contributing factors are the location and elevation of the station, DME transmitter power output, and receiver sensitivity.

The groundspeed feature incorporated in the unit measures the rate of change in DME slant range distance with time. This speed is then read from 0 to 999 knots in 1 knot increments. To obtain accurate groundspeed, the aircraft must be tracking directly to or from the station. To obtain accurate time to station, the aircraft must be tracking directly to the station.

# KR 87 Automatic Direction Finder



## Turn-on

Rotate the ON/OFF/VOL knob clockwise from the "OFF" position. The unit will be activated and will be ready to operate.

## Frequency Selection

The active frequency (to which the ADF is tuned) is displayed in the left side of the window at all times. A standby frequency is displayed in the right side when "FRQ" is annunciated. The standby frequency is placed in "blind" memory when either FLT (Flight Time) or ET (Elapsed Time) mode is selected.

With "FRQ" annunciated, the standby frequency is selected using the frequency select knobs which may be rotated either clockwise or counterclockwise. Pull the small inner knob out to tune 1's. Push the smaller inner knob in to tune 10's. The outer knob tunes the 100's and the 1000's up to 1799.

The standby frequency selected may then be put into the active window by pressing the "FRQ" button. The

standby and active frequencies will be exchanged (flip-flopped), the new frequency will become active, and the former active frequency will go into standby.

## Operating Modes

Antenna (ANT) mode is selected and annunciated when the "ADF" button is in the "out" position. ANT provides improved audio reception from the station tuned and is usually used for identification. (Note: The selected mode is unable to have an effect on the bearing indicator within the simulator).

The ADF mode is selected and annunciated when the "ADF" button is in the depressed position. ADF activates the bearing pointer in the bearing indicator, causing it to move without hesitation to point in the direction of the station relative to the aircraft heading. The compass card on the bearing indicator may be rotated as desired by using the heading knob.

## Operating the Timers

The flight timer will always be automatically reset to :00 whenever power is interrupted either by the avionics master switch or the unit's ON/OFF switch.

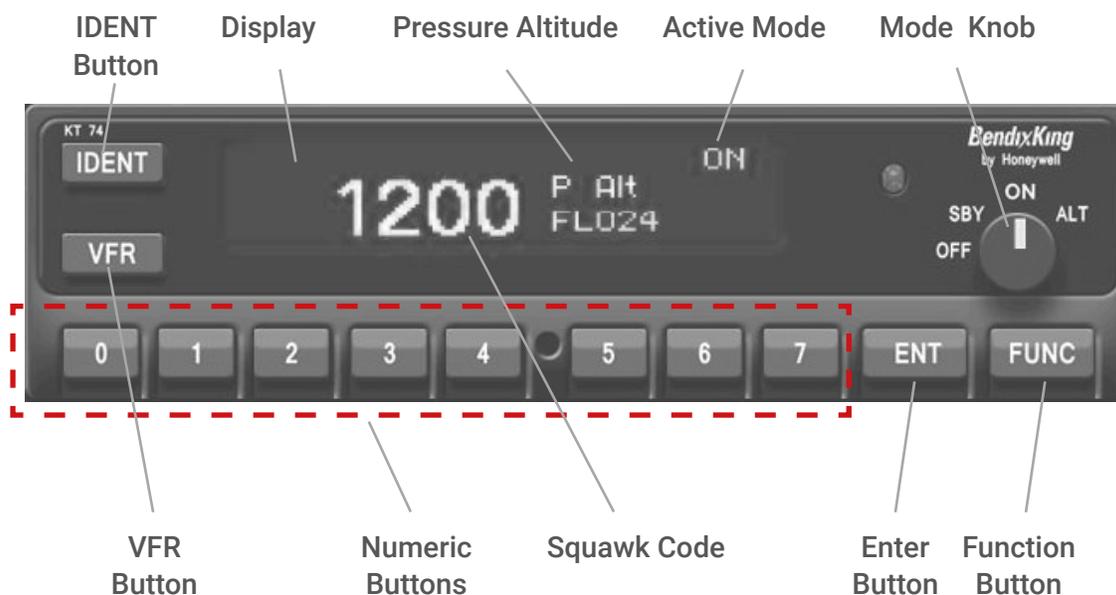
Flight time or elapsed time are displayed and annunciated alternatively by depressing the FLT/ET button. The flight timer continues to count up until the unit is turned off or stopped with an external switch. The elapsed timer may be reset back to :00 by pressing the SET/RST button. It will then start counting up again.

To enter the countdown mode on the elapsed timer, the SET/RST button is depressed for about two seconds, or until the "ET" annunciation begins to flash. It is now in the ET set mode, and a time up to 59 minutes, 59 seconds may be preset into the elapsed timer with the concentric knobs. The preset time will be displayed and remain unchanged until SET/RST is pressed again, which will start the elapsed timer counting down from the preset time. When the timer reaches :00 it will start to count up as the display flashes for 15 seconds

**NOTE:** The standby frequency which is in memory while flight time or elapsed time modes are being displayed may be called back by pressing the FRQ button, then transferred to active use by pressing the FRQ button again.

While FLT or ET is displayed the "in use" frequency on the left side of the window may be changed, by using the frequency select knobs, without any effect on the stored standby frequency or the other modes. This feature is especially useful when searching for stations with unknown frequencies.

# KT 74 Transponder



## Introduction

The KT 74 Transponder is a popular and feature rich model incorporating many current generation technologies. Its ability to replace many older transponder units makes it an increasingly common sight in general aviation.

## Front Panel Controls

The front panel of the KT 74 features the Display, the Mode Knob, the IDENT button, the VFR button, the numeric buttons, the ENTER button and the FUNCTION button.

## Display

The display shows the following indications:

- **Active Mode:** the Active Mode indicator shows the mode that is currently set on the Mode Knob.
- **Pressure Altitude:** The reported pressure altitude is displayed as a Flight Level (FL), which is the pressure altitude in hundreds of feet.
- **Squawk Code:** The current squawk code selected by the Numeric Buttons.

- **Flight ID:** The aircraft call sign entered on your flight plan.
- **IDENT Indicator:** The IDENT Indicator shows when IDENT mode is active.

## Mode Knob

The mode knob to the right of the display controls the power to the transponder and the operating mode. The mode knob has the following selections:

- **OFF:** Power is removed from the transponder.
- **SBY:** The transponder is on, but will not reply to any interrogations.
- **ON:** The transponder will respond to all interrogations, but altitude reporting is suppressed.
- **ALT:** The transponder will respond to all interrogations.

When airborne, the transponder should always be set to ALT unless otherwise directed by Air Traffic Control.

## Push Buttons

- **IDENT:** Press the IDENT button when ATC instructs you to “Ident” or “Squawk Ident”. This activates the SPI pulse in the transponder and replies for 18 seconds. IDENT will appear in the display.
- **VFR:** Pressing the VFR button sets the transponder to the pre-programmed VFR code. Pressing the button again restores the previous squawk code.
- **FUNC:** Pressing the FUNC button provides access to the flight timer, stopwatch, Flight ID entry, ADS-B monitor (depending on installation) and altitude monitor function.
- **ENT:** The ENT button confirms selection or presented options.
- **Numeric Buttons (0-7):** The numeric buttons are used to change the squawk code and as part of the data entry selections.

## Squawk Code Entry

Press any of the numeric buttons (0 through 7) to change the squawk code. A new squawk code is set when the fourth digit is entered. If the code entry is not completed within 7 seconds, the changes are ignored and the previous code restored.

A list of standard squawk codes is as follows:

- 1200 VFR code in the USA
- 7000 VFR code commonly used in Europe
- 7500 Hijack code
- 7600 Loss of communications
- 7700 Emergency code

## Functions

The different KT 74 functions are accessed using the FUNC button. The sequence of functions is as follows:

PWR ON (Squawk) -> Flight Time -> Timer -> Edit Flight ID -> Alt Monitor -> Squawk.

(Note: The sequence of functions is not able to take into account the presence of an installed GPS unit within the simulator, therefore the standard behaviour matches that of no GPS input, regardless of whether a GPS is present or not.)

## Flight Timer

Press the FUNC button once to display the Flight Timer. The Flight Timer records the time for which the transponder has been powered on and operating in flight mode – either ON or ALT.

## Stopwatch

Press the FUNC button twice to display the stopwatch. The stopwatch can be used as a convenient timer. Pressing ENT will reset and start the timer. Pressing ENT again will stop the timer.

## Flight ID Entry

Press the FUNC button three times to display the Flight ID entry screen. Edit the Flight ID using the numeric buttons. The lower portion of the display shows the alpha numeric characters selected through multiple presses of the numeric buttons. When the correct character is shown in the flight ID section of the screen, press the ENT button to accept and advance to the next digit. The flight ID is terminated with a “space” character located on the 7 button. When ENT is pressed on the end space, the new Flight ID will replace the previous value. If a button is not pressed for 7 seconds, the changes are ignored and the previous code restored.

The Flight ID should correspond to the aircraft call sign entered on your flight plan. If no flight plan is active, the aircraft registration should be used as your Flight ID. Use only letters and digits. If the Flight ID is less than 8 characters long, enter the “space” character (7 button) to end it.

## Altitude Monitor

Press the FUNC button four times to display the Altitude Monitor enable screen. The Altitude Monitor activates an audio annunciator or annunciator light (depending on installation) when the aircraft pressure altitude differs from the selected altitude by more than 200 feet. Pressing ENT toggles the altitude monitor at the current altitude.

When altitude monitoring is in use, a small deviation pointer appears adjacent to the altitude display on the transponder.